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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/706,777	11/10/2003	Cedomila Ristic-Lehmann	FA/263	7870

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EXAMINER	
HU, HENRY S	

ART UNIT	PAPER NUMBER
1713	

DATE MAILED: 02/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/706,777	RISTIC-LEHMANN ET AL.	
	Examiner	Art Unit	
	Henry S. Hu	1713	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *election of January 10, 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-98* is/are pending in the application.

4a) Of the above claim(s) *18-98* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☒ Claim(s) *1-3* is/are objected to.

8)☒ Claim(s) *1-98* are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *10 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4-8-2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This Office Action is in response to the election filed on January 10, 2005.

Applicant's election of Group I, Claims 1-17 and 61-86 is traversed with remarks on page 1. The traversal is on the ground(s) that it would not place an undue burden to search and examine the non-elected Group II (Claims 18-50), Group III (Claims 51-60 and 87) (please note that **Claim 87 is rejoined with Group III since it is dependent from parent Claim 51** after examiner's further consideration) and Group IV (Claims 88-98) with Group I since they are so closely related in the field of aerogel/PTFE composites. This is not found persuasive because each of Group II and Group III is drawn to a technology apparently requiring search in different classification area. In the instant case Group II was drawn to a two-layered article bonded with the material having the claimed thermal conductivity by aerogel particle being held together with PTFE as well as its process of making, Group III was drawn to a two-layered article bonded with the material having the claimed thermal conductivity by aerogel particle being held together with PTFE as well as its process of making, while Group IV was drawn to a portable electronic device as well as its process of making.

As discussed earlier, **Inventions II and I** are related as combination and subcombination, **Inventions II and IV**, and **Inventions III and IV** are each related as mutually exclusive species in an intermediate-final product relationship, while **Inventions I and III, Inventions I and IV,**

and **Inventions II and III** are each unrelated. Therefore, the scope of the claims, i.e., the metes and boundaries are distinct.

2. In a very close examination, the examiner has further found that restriction of Group I into Group I-A (Claims 1-17) and Group I-B (Claims 61-86) is necessary as following justification. Group I-A only relates to a material comprising aerogel particles and a polytetrafluoroethylene (PTFE) binder, while Group I-B relates to a material comprising aerogel particles and interconnected polytetrafluoro-ethylene (PTFE) fibrils. They are actually producing **two different aerogel composite materials** in terms of composition, structure, crosslinking and properties.

Since Claims 1-17 of Group I-A is more closely related to the claimed limitation originally elected, Claims 61-86 of Group I-B are now withdrawn from consideration as being directed to a non-elected invention. In summary, **Claims 1-98 are pending now, while non-elected Claims 18-98 are withdrawn from consideration by the examiner**. An action follows.

Specification

3. The disclosure is objected to because of the following informalities:

On **page 5** at line 19 and on **page 20** at line 2 may be throughout the specification, recitation for **Kelvin temperatures of "298.15" and "298.5" for measuring thermal conductivity <u>are not the same temperatures</u>**. It may have a typographical error.

Appropriate correction is required.

Claim Objections

4. Claims 1-3 are objected to because of the following informalities:

On **Claim 1** at line 5, **Claim 2** at line 2 and **Claim 3** at line 2, all recitations of "**<u>at atmospheric conditions</u>" are without giving any specific condition and thereby may be improper**. The Examiner suggests rewriting it by using the disclosure of "**298.5 K and 101.3 kPa**" on page 5 at lines 19-20 as well as the measurement of thermal conductivity on page 18, line 31 – page 19, line 14. Otherwise, one having the ordinary skill in the art may be confused. For clarification, the examiner also suggests adding the statement of "**<u>milliwatt per meter Kelvin</u>**" on page 1 at line 22 to be after the unit of "mW/m K".

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-17 are rejected under 35 U.S.C. 102(b) as being anticipated by Stepanian et al. (USPG-PUB 2002/0094426 A1).

The limitation of parent ***Claim 1*** *in present invention relates to a material comprising (A)* ***aerogel particles*** *and (B) a* ***polytetrafluoroethylene (PTFE) binder****, wherein the material has a thermal conductivity of less than or equal to 25 mW/m K at atmospheric conditions. See other limitations of dependent* ***Claims 2-17****.*

7. Regarding the limitation of parent **Claim 1, Stepanian** et al. disclose a method of making **aerogel composite materials** comprising two different phases, **one is a low-density "aerogel matrix" and the second is a reinforcing phase** (abstract; paragraphs 0024 and 0026). Stepanian et al. further disclose that **the reinforcing phase consists primarily of a lofty fibrous material such as polytetrafluoroethylene (PTFE)** (paragraphs 0026, 0039 and 0049). Stepanian et al. furthermore disclose that **such a material has a thermal conductivity around 12-15 mW/m K, which is overlapping the claimed value** (paragraphs 0069, 0072, 0074, 0076 and 0079).

8. Regarding **Claims 2 and 3**, Stepanian et al. disclose that such a material has a thermal conductivity around **12-15 mW/m K** (paragraphs 0069, 0072, 0074, 0076 and 0079).

Regarding **Claim 4**, such an aerogel has a **pore size in "sub-nanometer" scale** (paragraphs 0003 and 0024).

Regarding **Claims 5-7**, the **weight ratios** in working examples in paragraphs 0064 – 0078 have had the claimed number.

Regarding **Claims 8-9**, one of the aerogels used by Stepanian is a **silica aerogel** (paragraphs 0028 and 0031).

Regarding **Claim 10**, suitable PTFE microfibers useful herein typically range from **0.1 to 100 in diameter**, and have high aspect ratios at higher than 5 (paragraph 0046).

Regarding **Claim 11**, the first and second fibrous material as discussed in the rejection of Claim 1 may be from **different** fibrils (paragraphs 0049 and 0050).

Regarding **Claim 12**, other finely dispersed dopants such as **carbon black** can be included (paragraph 0033).

Regarding **Claims 13-17**, the final material is in the form of solid **powder** (paragraphs 0009 and 0013). The material has unique properties as disclosed in paragraphs 0013 - 0015, it is quite **conformable** for making articles of Claims 14-17.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frank et al. (US 5,786,059) in view of Stepanian et al. (USPG-PUB 2002/0094426 A1).

Regarding the limitation of parent **Claim 1, Frank** et al. disclose a method of making **aerogel composite materials** comprising (A) at least one layer of bicomponent fiber web material and (B) aerogel particles (abstract, line 1-4; column 4, line 44 – column 5, line 11). Frank et al. furthermore disclose that **such a composite material has a low thermal conductivity around 23 mW/m K, which is overlapping the claimed value** (see working

examples 1 and 2). This kind of thermal conductivity can be further decreased by increasing porosity and/or decreasing density (column 3, line 35-40).

11. The Frank reference is silent about using a **polytetrafluoroethylene (PTFE)** as the bicomponent fiber (column 2, line 25-40). It is noted that bicomponent fiber has two firmly interconnected polymers of two different chemical and/or physical constructions and which have regions having different melting points (column 2, line 25-30). **Stepanian** et al. has taught that in the course of making aerogel composite materials, it may comprise two different phases, **one is a low-density "aerogel matrix" and the second is a reinforcing phase** (abstract; paragraphs 0024 and 0026). Stepanian et al. further disclose that **the reinforcing phase consists primarily of a lofty fibrous material such as polytetrafluoroethylene (PTFE)** (paragraphs 0026, 0039 and 0049). Stepanian has furthermore disclosed that it preferably uses **a combination of two fibrous material system** by penetrating through the dispersed aerogel matrix with the lofty batting (one fibrous material) and one or more other fibrous materials (the second fibrous material) (see paragraph 0026). The advantage is such an obtained aerogel composite material is in the form of solid powder and is quite **conformable** for making many useful articles (paragraphs 0009 and 0013).

12. In light of the fact that the polymer mixture used by Stepanian and the fiber web used by Frank have the same or similar bicomponent properties, and both references are applied for the same aerogel composite manufacturing. Therefore, one having ordinary skill in the art would have found it obvious to **modify Frank's aerogel composite composition by replacing the**

bicomponent fiber web with a mixture of PTFE and other fibrous material as taught by Stepanian based on the functional equivalence and interchangeability. One would expect all embodiments in the same genus would succeed. Additionally, one advantage is to obtain an aerogel composite composition with more **conformability** in making many useful articles as disclosed by Stepanian.

13. The discussion of the disclosures of the prior art of Stepanian et al. for Claims 1-17 of this office action is incorporated here by reference. With the teaching or disclosure from both Stepanian and Frank, remaining dependent **Claims 2-17** are thereby rejected.

Conclusion

14. The prior art made of record and not relied upon is considered pertinent to applicants' disclosure. The following references relate to a material comprising aerogel particles and a polytetrafluoroethylene (PTFE) binder:

USPG-PUB No. 2004/0029982 A1 to Erkey et al. discloses a method of making metallic aerogel compositions comprising an aerogel of RF or a carbon aerogel, both with metallic particles dispersed on its surface (abstract, line 1-3; paragraphs 0018 – 0022). However, **no polytetrafluoroethylene (PTFE) is included at all**. Therefore, Erkey fails to teach or fairly suggest the limitation of present invention.

15. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Henry S. Hu whose telephone number is **(571) 272-1103**. The examiner can be reached on Monday through Friday from 9:00 AM –5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Wu, can be reached on (571) 272-1114. The fax number for the organization where this application or proceeding is assigned is (703) 872-9306 for all regular communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Henry S. Hu

Patent Examiner, Art Unit 1713, USPTO

February 21, 2005

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